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EXAMINER
NGUYEN, NGOC YEN M

ART UNIT	PAPER NUMBER
1754	14

DATE MAILED: 06/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/212,107	ARNO ET AL.	
	Examiner	Art Unit	
	Ngoc-Yen M. Nguyen	1754	

-- The MAILING DATE of this communication app ars on the cover sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 May 2001* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-64* is/are pending in the application.

4a) Of the above claim(s) *1-20, 22-25, 28- 50, 62-64* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21,26,27 and 51-61* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-64* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Newly submitted claims 62-64 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: claims 62-64 are drawn to non elected species because they require not only the elected species c) but also another non-elected species.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 62-64 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 21-27, 60 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

For claims 51, 53, Applicants pointed out support for "no caustic reagent" may be found on page 20, lines 9-10 and page 28, line 20, however, such support cannot be found (it is unclear

if Applicants have a different version of the specification than the instant specification). It is noted that on page 46 of the instant specification, lines 5-7, it is disclosed that "... allows the 2-stage scrubber system to operate without using chemical injection agents or large amount of fresh water", but it is unclear if the "chemical injection agents" would be the same as no caustic reagent". It is also noted that the "chemical injection agents" are disclosed on pages 22-23 of the instant specification, these agents are reducing agents such as, sodium thiosulfate, ammonium hydroxide and potassium iodide (note page 23, lines 6-12) to enhance the remove of fluorocompound, however, NH_3 can also be used to remove OF_2 (note page 28, lines 17-21) instead of the fluorocompound or caustic can be used to remove silane (note page 33, lines 27-31). Thus, there is no clear support for the claimed limitation of "the second scrubbing zone contains *no* caustic reagent".

For claim 52, again support for "neutral water" cannot be found at page and line numbers pointed out by Applicants. Neutral water is mentioned on page 33, lines 11-16, but for the step of removing silane, not for the 2-step scrubbing process.

For claims 21, 26, support for limitation "second contacting chamber has a smaller volume than that of said first contacting chamber" is found on page 46, lines 3-4, which states "smaller column size...". However, in claims 55-56, which are dependent on claims 21, 26, it is required that the second contacting chamber (second scrubbing zone) has smaller diameter than the first contacting chamber (first scrubbing zone), this indicates that the scope of claims 21, 26 would be

broader, i.e. the diameter of the second contacting chamber can be the same or bigger than the first contacting chamber and there is no support for such scope.

For claims 57-58, it is disclosed in the instant specification, page 47, lines 30-36, that the first column has a diameter of 21" and the second column has a diameter of 4", the ratio of the second diameter to the first diameter is 4/21 (0.19) which can be "about one fifth" (about 0.20) as required in the instant claims, however, the limitation of "about one fifth" also includes values slightly higher than 0.20 and there is no support in the instant specification for any value higher than 0.20.

Claims 27, 61 are objected to because of the following informalities: there is no period at the end of claim 27; The number "61." should be deleted from claim 61. Appropriate correction is required.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 21, 26-27, 55-56, 55-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Macedo et al (5,405,590).

Macedo '590 discloses a process for cleaning exhaust off-gas from a thermal processing unit containing contaminants, the process comprising:

passing exhaust off-gas through an initial wet exhaust off-gas scrubber unit having a first basic solution containing at least one base reagent and water,

contacting the exhaust off-gas with a spray of said solution to cool the exhaust off-gas by partial evaporation,

reacting at least one contaminant from the exhaust off-gas with the base reagent in a liquid stream,

said partial evaporation and reaction resulting in concentration and precipitation of said at least one contaminant from the exhaust off-gas,

further introducing the exhaust off-gas to at least one secondary scrubbing unit having a second basic solution containing at least one base reagent and water resulting in further removal of contaminants from the exhaust off-gas,

removing solid precipitate from the initial exhaust off-gas scrubber unit in the form of a wet sludge (note claim 1).

As shown in the Figure, the off-gas entering scrubber 20 at inlet 20A encounters a high velocity, high pressure water/reagent spray jet 41 (note column 3, lines 65-67). During normal operations, especially when acid gases are being scrubbed, the reaction of the scrubbing reagents with acid contaminants occurs above the spray nozzles 41 where a misty curtain of the solution is normally formed (note column 4, liens 30-37). The purified off-gas then travels up through

conduit 50 into a second stage scrubbing unit 80 (note column 4, lines 7-8). The off-gas exhaust is further scrubbed by a reagent solution sprayed downward from spray nozzles 106. Spray nozzles 106 produce a high velocity solution curtain across the top cross section of the scrubber 80 which effectively removes the majority of the leftover contaminants from the exhaust gases emitting from scrubber 20.

Macedo '590 fairly teaches that acid gases are removed in the first scrubber and the leftover contaminants are removed in the second scrubber. The leftover contaminants would include water scrubbable components other than acid gas components as required in the instant claim 26.

As evidenced by the figure, Macedo '590 fairly teaches that in the first scrubber, the scrubbing liquid and the exhaust off-gas are flowing concurrently and in the second scrubber, they are flowing countercurrently.

The difference is Macedo '590 does not disclose the size, the diameter of the second scrubber as compared to the first scrubber.

However, Macedo '590 discloses that the first scrubber is used to remove acid gases and the second scrubber is used to remove the leftover contaminants. Thus, it would have been obvious to one of ordinary skill in the art to optimize the size of the two scrubbers in order to obtain the best results, i.e., for removing the most contaminants with the lowest total cost.

Claims 21, 26-27, 55-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dahlstrom et al (4,147,756).

Dahlstrom '756 discloses a system for removing gaseous sulfur dioxide and chloride components from a gas stream (note claim 1). From Figure 1, in the scrubbing device 11, the gas inlet 13 is connected in communication with the upper end of the housing of the scrubbing device and the introduced gases flow downward therefrom to an outlet conduit 14. The scrubbing liquid is discharged in the housing by means such as spray nozzles 15 and flows downwardly cocurrent with the gas flow (note column 3, lines 7-13). The system further comprises a scrubber 51 connected to receive, via the conduit 14, the gases treated in scrubber 11 (note column 4, lines 23-26). In scrubber 51, the scrubbing liquid is discharged in the scrubber housing by liquid outlet means 53, and flows downward countercurrent to the gas flow (note column 4, lines 47-55).

In the process of Dahlstrom '756, the first scrubber removes hydrogen chloride gas and other chlorine components. The second scrubber removes sulfur oxides. The second scrubber would also remove any other residual contaminants in order to produce an exhaust gas which is suitable for discharging into the atmosphere.

The difference is Dahlstrom '756 does not disclose the size of the second scrubber.

It would have been obvious to one of ordinary skill in the art to optimize the size of the two scrubbers in order to obtain the best results, i.e., for removing the most contaminants with the lowest total cost.

Claims 21, 26-27, 51-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knapp (6,019,818).

Knapp '818 discloses a process for simultaneously quenching and scrubbing a hot gas stream (note claim 1). Knapp '818 further discloses that the process can be conducted in a column which need not be as tall as a conventional spray quencher column and if desired, a polishing scrubber may be used to further purify the gaseous products (note first full paragraph in column 3). Knapp '818 teaches that the column contains packing (note Figure 1) and that it is well known in the art that the scrubbing liquid can be water, a basic solution, or an acidic solutions (note column 2, lines 10-19). Thus, it would have been obvious to one of ordinary skill in the art to use any known scrubbing liquid in the art for the process of Knapp '818.

The difference are Knapp '818 does not disclose the details for the "polishing column", i.e., flow direction and size, diameter, flow rate as compared to those of the first column.

Macedo '590 is applied as above to teach for the second scrubbing column, it is conventional to operate it in countercurrently manner (note Figure).

For the size of the polishing scrubber, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the size thereby the diameter and flow rate of the polishing column in Knapp '818 in order to efficiently further purify the gaseous products.

Applicant's arguments filed May 22, 2002 have been fully considered but they are not persuasive.

Applicants stated under remarks that "Applicants hereby affirm cancellation of claims 1-20, 30-33 and 50", however, there was intruction to cancel these claims.

The 102 rejections are withdrawn in view of Applicants' amendments to the claims.

Applicants argue that Dahlstrom and Macedo both disclose a two-stage scrubber having a second scrubbing unit that is as large or larger than the first scrubbing unit.

Granted that in the figures, the second scrubbing unit in Dahlstrom and Macedo was shown as being bigger than the first column, however, the figures are not to scale, the second column column might have been drawn bigger in order to clearly shown all the details. There is no disclosure in the either reference requiring the second scrubber to be bigger than the first scrubber. It would have been obvious to one of ordinary skill in the art to optimize the size of the scrubbers in order to achieve the desired results with minimum capital and operating cost.

Applicants argue that it is impossible to recognize by the teachings of the prior art that a specific volume of the second scrubbing unit is necessary to maximize the effectiveness of the scrubbing system.

It should be noted that in Knapp, the second column is a "polishing column", just as that of Applicants' process, and in Macedo, the second column is to effectively remove the majority of the leftover contaminants from the exhaust gases emitting from the first scrubber (note column 5,

first full paragraph), thus, it would have been obvious to one of ordinary skill in the art to optimize the size of the second scrubber in order to achieve the intended goal.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References AC, AD, AE as cited on the 1449 form (filed March 22, 1999) were not considered because no copies were found in the case.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Ngoc-Yen Nguyen whose telephone number is (703) 308-2536. The examiner is currently on a part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Stanley Silverman, can be reached on (703) 308-3837. The fax phone number for this Group is (703) 872-9311 (for OFFICIAL After Final amendment only) or (703) 872-9310 (for all other OFFICIAL faxes). UNOFFICIAL fax can be sent to (703) 305-6078.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Ngoc-Yen Nguyen

N. M. Nguyen
June 3, 2002

N. M. Nguyen
Primary Examiner
Art Unit 1754